

What is claimed is:

1. A variable supply amplifier system comprising:
a power amplifier operative to amplify an input signal;
a digital buffer that stores a copy of the input signal representing a predetermined interval of time;
an envelope profiler that analyzes the buffered interval of the input signal and determines an appropriate supply signal profile for the power amplifier over the predetermined time interval; and
a supply control that provides a supply signal according to the determined profile.
2. The system of claim 1, further comprising a supply assembly that processes the supply signal to provide a supply voltage to the power amplifier.
3. The system of claim 2, the envelope profiler determining the appropriate supply profile as to optimize one of an efficiency parameter and a linearity parameter associated with the of the power amplifier and the associated supply assembly.
4. The system of claim 2, the envelope profiler determining the appropriate supply profile having a slew rate corresponding to a maximum bandwidth associated with the supply assembly.
5. The system of claim 4, the envelope profiler determining an appropriate supply profile according to the maximum bandwidth and a headroom parameter, which defines a minimum voltage by which the supply signal must exceed a desired output signal associated with the power amplifier.
6. The system of claim 2, the supply assembly comprising a digital-to-analog converter (DAC) and an amplifier.

7. The system of claim 6, the DAC comprising a delta-sigma DAC, such that the digital representations of at least one of the input signal and the supply signal are converted into the analog domain directly at a desired radio transmission frequency.

8. The system of claim 1, further comprising a predistortion component that modifies at least one of the input signal and the supply signal in the digital domain to mitigate output distortion of the power amplifier.

9. The system of claim 1, further comprising a digital cross-cancellation component that generates a reference signal corresponding to a desired output signal of the amplifier system, the reference signal being combined with a portion of an output signal from the power amplifier to determine an error signal, the error signal being inverted and combined with a delayed version of the output signal of the power amplifier to generate a final output signal.

10. The system of claim 1, further comprising a predistortion component that modifies at least one of the supply signal and the input signal to mitigate output distortion of the power amplifier and a digital cross-cancellation component that generates a reference signal corresponding to a desired output signal of the amplifier system, the reference signal being combined with a portion of an output signal from the power amplifier to determine an error signal, the error signal being inverted and combined with a delayed version of the output signal of the power amplifier to generate a final output signal.

11. The system of claim 10, the reference signal being provided to a delta-sigma digital-to-analog converter (DAC) to convert the reference signal from the digital domain to the analog domain directly to a desired radio transmission frequency.

12. The system of claim 10, further comprising a peak-to-average reduction (PAR) component that clips and/or removes peaks signals from the input signal, the

digital cross-cancellation component providing corrective signals to the final output signal.

13. The system of claim 1, further comprising a feedback path to compensate for variations in age and temperature of the amplifier system.

14. A transmitter comprising the amplifier system of claim 1.

15. A base station comprising the transmitter of claim 14.

16. The system of claim 1, further comprising a delay component that delays the input signal as to synchronize the input signal with the supply signal.

17. A method of amplifying an input signal comprising:
buffering at least a portion an input signal corresponding to an interval of time;
analyzing the buffered signal portion to determine an appropriate supply signal for a power amplifier across the interval of time; and
amplifying the input signal at the power amplifier using the determined supply signal to produce an amplified output signal.

18. The method of claim 17, further comprising delaying the input signal to synchronize the input signal with the determined supply signal at the power amplifier.

19. The method of claim 17, further comprising modifying at least one of the input signal and the supply signal in the digital domain to mitigate distortion of the amplified output signal introduced by the power amplifier.

20. The method of claim 17, further comprising:
generating a reference signal corresponding to a desired output signal of the amplifier system;

combining the reference signal with a portion of the amplified output signal to determine an error signal;

inverting the error signal; and

combining the error signal with a delayed version of the amplified output signal of the power amplifier to generate a final output signal.

21. The method of claim 17, further comprising:

modifying at least one of the input signal and the supply signal in the digital domain to mitigate distortion of the amplified output signal introduced by the power amplifier;

generating a reference signal corresponding to a desired output signal of the amplifier system;

combining the reference signal with a portion of the amplified output signal to determine an error signal;

inverting the error signal; and

combining the error signal with a delayed version of the amplified output signal of the power amplifier to generate a final output signal.

22. An variable supply amplifier system comprising:

means for building a supply profile by analyzing a signal envelope corresponding to an input signal over a period of time;

means for producing an amplifier supply signal over the period of time corresponding to the supply profile; and

means for amplifying the input signal, the means for amplifying receiving the amplifier supply signal as a supply voltage based on the supply profile.

23. The system of claim 22, further comprising means for synchronizing the input signal with the supply signal.

24. The system of claim 22, further comprising means for converting at least a portion of the input signal from the digital domain to the analog domain directly to a desired radio transmission frequency.

25. The system of claim 22, further comprising means for modifying the input signal and means for modifying the output signal to facilitate amplifier system efficiency and mitigate out-of-band emissions.

26. The system of claim 25, further comprising means for providing feedback to the means for modifying.